Using Linked Federal and State Data to Study the Adequacy of Workers' Compensation Benefits

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Background *We combined federal and state administrative data to study the long-term earnings losses associated with occupational injuries and assess the adequacy of workers' compensation benefits.*
Methods *We linked state data on workers' compensation claims from New Mexico for claimants injured from 1994 to 2000 to federal earnings records from 1987 to 2007. We estimated earnings losses up to 10 years after injury and computed the fraction of losses replaced by benefits.*
Results *Workers with lost-time injuries lost an average of 15% of their earnings over the 10 years after injury. On average, workers' compensation income benefits replaced 16% of these losses. Men and women had similar losses and replacement rates. Workers with minor injuries had lower losses but also had lower replacement rates.*
Conclusion *Earnings losses after an injury are highly persistent, even for comparatively minor injuries. Income benefits replace a smaller fraction of those losses than previously believed.* Am. J. Ind. Med. 57:1165–1173, 2014.   © *2014 Wiley Periodicals, Inc.*

KEY WORDS: *workers' compensation; disability compensation; injured workers; earnings losses; injury cost*

INTRODUCTION

Occupational injuries and illnesses remain a serious public health concern. In 2011, there were nearly three million reported nonfatal injuries and illness, of which more than one-half involved days away from work [Bureau of Labor Statistics, 2012]. For most workers in the U.S., state workers' compensation systems pay for medical care resulting from the injury and offer cash benefits to compensate for lost earnings. An important policy question is the adequacy of workers' compensation benefits—that is, what fraction of lost earnings is replaced by benefits? Comparing benefit levels to empirical estimates of earnings losses has become a standard approach to assessing the adequacy of workers' compensation benefits [Hunt, 2004; National Academy of Social Insurance, 2004]. Past studies from U.S. jurisdictions have often found that injured workers experience significant losses from work related injuries and that the replacement of lost earnings was low on average [Berkowitz and Burton, 1987; Biddle, 1998; Boden and Galizzi, 1999, 2003; Reville, 1999; Bhattacharya et al., 2010; Seabury et al., 2013]. However, prior studies have faced data limitations that could affect their assessments of benefit adequacy.

There have been two chief limitations facing prior U.S. studies of earnings losses and benefit adequacy [Biddle, 1998; Boden and Galizzi, 1999; Reville, 1999]. The first is

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that the studies have almost all relied on earnings information from state unemployment insurance (UI) records. Although UI data provide rich information on wage and salary income within a given state, they do not include any earnings from outside the state nor do they include self-employment earnings. If injured or disabled workers are more or less geographically mobile than comparison workers, or if they are more or less likely to engage in self-employment, this could lead to biased estimates of earnings losses. Second, these studies have generally lacked information on earnings beyond 5 years after injury. Income benefits are usually fully paid within the first 5 years, so if earnings losses persist, the effective replacement rates will decline over time. While several studies have investigated the adequacy of compensation in the long term, they have been forced to extrapolate earnings losses based upon 5 years of post-injury data [Reville et al., 2001; Boden et al., 2005; Bhattacharya et al., 2010].

This research takes advantage of a unique dataset linking state workers compensation data from New Mexico to federal earnings data from the Social Security Administration (SSA) and the Internal Revenue Service (IRS) for 3 years before and up to 10 years after a workplace injury. The dataset addresses both gaps in prior research, allowing us to evaluate the long-term earnings losses and replacement rates of injured workers and test for systematic differences in self-employment before and after an injury. Using these data, we provide a more comprehensive assessment of the long-term adequacy of workers' compensation benefits.

In 1997, the midpoint of our study period, New Mexico experienced a lower (6.5 cases per 100 full-time workers) [Bureau of Labor Statistics, 1998a] incidence of reported injuries and illnesses than the national rate (7.1 cases per 100 full time workers) [Bureau of Labor Statistics, 1998b]. This is despite the fact that there are higher concentrations of mining and construction workers in New Mexico than in many other states.

The New Mexico workers' compensation system requires that all firms with three or more employees either self-insure or buy insurance in the private market. In 1997, workers' compensation benefits as a percent of covered wages in New Mexico ranked 38th of the 50 states [Mont et al., 2001]. To become eligible for temporary disability benefits, individuals must have been off work for more than 7 days. Such workers are paid a "compensation rate" of two-thirds of their pre-injury wages up to the New Mexico compensation maximum, which is based on average wages within the state. Among the state workers' compensation systems, this is the most common way of calculating the compensation rate. Before 2000, the maximum was 85 percent of the State Average Weekly Wage. Beginning in 2000, the maximum was 100 percent of the State Average Weekly Wage. For permanently disabling injuries, payment depends upon whether the injury is categorized as a "whole body" ("unscheduled") injury (typically involving back and neck injuries) or a "scheduled" injury (typically an injury to a finger, hand, arm, or leg). Workers with whole body injuries receive the weekly compensation rate on a weekly basis for a percentage of 500 weeks (or 700 weeks if the disability rating is greater than 80%). The percentage depends on the degree of impairment, as measured by the American Medical Association Guides to the Evaluation of Permanent Impairment. For injured workers who earn less than their pre-injury earnings, other factors may raise the number of weeks benefits are paid. In contrast, "scheduled" benefits provide compensation for a fixed number of weeks for a worker with complete loss of use of particular body member, ranging from 7 to 200 weeks.

METHODS

We define earnings losses as the difference between the actual earnings of injured workers after an injury occurs and the expectation of what they would have earned in the absence of an injury. To assess the "true" earnings losses of an injured worker, we would need to observe an individual's actual labor income when both injured and uninjured, which is obviously impossible to measure in practice. Instead, we followed standard practice in this literature and estimated the expected earnings of injured workers using the actual post-injury income of a comparison group. Specifically, we used multivariable regression to estimate the post-injury difference in earnings between injured and comparison workers while controlling for observed and unobserved factors that could influence earnings.

Data

The New Mexico Workers' Compensation Administration (WCA) provided us with data on all cases with injury dates from 1992 through 2001 for which workers' compensation benefits were paid (N = 214,230). The data, which are used and described in past work, [O'Leary et al., 2012] included information on the characteristics of the injured worker, the injury and the employer, compensated time lost from work, and benefits paid. From 1992 through 2001, there were 63,689 lost-time cases (30% of the total). The remaining 150,541 cases (70%) comprised workers who received only medical-care benefits. This means that they either had no time off work, or they had time off work but not enough to exceed the waiting period to qualify for lost-time benefits in New Mexico (7 days). These cases are generally referred to as "medical-only" injuries.

Generally speaking, there are four types of lost-time claims in workers' compensation systems which are as follows: temporary disability (TD), permanent partial disability (PPD), permanent total disability (PTD), and death. Of these, TD claims are the most common (N = 45,197; 21%

of total), followed by PPD claims (N = 18,039; 8%), with a small fraction of cases involving PTD or death (N = 453; 0.2%). We excluded the PTD or death cases because they are too small a sample to study on their own, and it does not make sense to pool them with other types of cases.

There is considerable heterogeneity in the severity of injury for TD cases, and more severe injuries should experience worse earnings losses. Based upon prior research, we classified TD cases into two groups: those missing less than 8 weeks and those absent 8 weeks or more [Biddle, 1998; Boden and Galizzi, 1999]. For descriptive purposes, we describe these as moderate and severe temporary injuries, respectively.

In the WCA sample, 38% of injured workers had more than one workplace injury from 1992 through 2001. That is important because the first injury might causally affect the occurrence and impact of subsequent injuries. Because we do not observe individuals before 1992, it is possible that the first injury we observe for a worker is not the actual first injury. To limit potential bias by misidentifying the first injury, we excluded workers whose first observed injury occurred in 1992 or 1993 (49% of second injuries in our data occur within 2 years of the first injury). We kept one injury record for each injured worker and designated the index injury to be the first lost-time injury in the data. If a worker incurred exclusively medical-only injuries, we considered the first of those as the index injury. We excluded injuries in 2001 to increase the proportion of the sample with a 10-year observed period after the date of initial injury.

Our primary variable for linking information across sources was the Social Security number (SSN). However, SSNs can sometimes be missing or invalid, causing inaccuracies in the match. We used Social Security's Enumeration Validation System, based on the master files of SSN holders and Social Security number applications (NUMIDENT), to verify the SSNs of injured workers using the WCA-provided SSN, name, date of birth, and sex. The NUMIDENT is a computer database that contains an abstract of the information submitted for SSN applications. We found that approximately 96% of our sample had valid SSNs.

Using the validated SSN, we linked each worker to his or her Detailed Earnings Record (DER) from Social Security's Master Earnings File (MEF), retrieving annual earnings through the end of 2007. SSA derives the MEF data from IRS Form W-2, quarterly earnings records, and annual income tax forms. Those data include wages and salaries, self-employment income, and deferred compensation. Many workers had multiple sources of earnings in any given year (i.e., they worked more than one job or for more than one employer). Using the DER, we determined the "employer of injury" in the following way. If the employer identification number (EIN) in the WCA file matched any of the EINs in the IRS data for that year, we used that EIN. In cases where none of the IRS EINs matched the WCA EIN or the WCA EIN was missing, we used the highest earning IRS EIN in the year of injury. This is consistent with past work using state UI data on earnings [Berkowitz and Burton, 1987; Reville et al., 2002; National Academy of Social Insurance, 2004; Boden et al., 2005; O'Leary et al., 2012].

Finally, we dropped a few cases for which there were important variables (e.g. gender) missing from the file. All of the exclusions described above reduced our final analytic sample to 100,174 cases, of which 64,500 (64%) were medical only and 35,674 (36%) were lost-time.

All dollar values were normalized to year 2007 dollars using the West Region Consumer Price Index (CPI). All calculations for this project were done using either SAS 9.3 or using STATA 12 MP for Windows (64-bit)©. For appropriate human subjects protection and to comply with Federal law, all identifiable SSA and IRS data were maintained in the secure environment of the SSA and were only available to Dr. O'Leary, who is a SSA employee. Confidentiality/privacy agreements were signed between the State of New Mexico and the institutions sharing its data—Boston University and the SSA. The study was approved by the Boston University and RAND Institutional Review Boards.

Statistical Analysis

Estimating earnings losses requires a comparison group of workers whose long-term earnings are unaffected by workplace injuries and who are observably similar to injured workers. There are two standard approaches to selecting comparison workers: use never-injured workers with similar pre-injury characteristics (such as working at the same firm), or use injured workers who lost little or no time from work (i.e., medical-only cases) [Reville, 1999].

Because we are unable to ascertain the state of employment for comparison workers in our data, we chose the latter approach and used the medical-only cases in our data as comparison workers. Because these medical-only cases involve seven or fewer lost days, the underlying severity of the injuries is (presumably) low and should result in little long-term physical impairment. The underlying assumption is that any earnings losses associated with medical-only injuries are minor and should not have a substantial association with earnings over a 10-year period. This approach has been used in past work [Berkowitz and Burton, 1987; Biddle, 1998], though evidence is mixed as to whether using uninjured workers or workers with medical-only injuries as a comparison group yields different results [Woock, 2009; Crichton et al., 2010]. In the discussion, we note that earnings losses estimates could be biased downward if relatively minor injuries are associated with lower long-term earnings. For expositional purposes, we distinguish between "injured" and "comparison" workers.

We estimate the effect of injuries on earnings using the following regression model:

$$y_{it} = \sum_{t=-5}^{-2} \alpha_{0t} pre_t + \sum_{t=-5}^{-2} \alpha_{1t} pre_t \times injured_i$$
$$+ \sum_{t=0}^{10} \beta_{0t} post_t + \sum_{t=0}^{10} \beta_{1t} post_t \quad (1)$$
$$\times injured_i + \gamma Z_{it} + \varepsilon_{it}$$

Here, y_{it} is equal to the earnings or participation in self-employment of individual i in time t. The variables pre_t and $post_t$ represent dummies for the pre-injury and post-injury period, respectively, while the variables $pre_t \times injured_i$ and $post_t \times injured_i$ are these same dummies interacted with dummies indicating whether or not the person was injured. We estimate separate coefficients for each year from 2 to 5 years prior to injury and 0 to 10 years after injury. The key parameters of interest are the terms β_{1t}, the effect of the injury on earnings for injured workers at each time t over the course of the post injury period. These coefficients are interpreted as estimates of earnings losses, the difference between an injured worker's earnings and expected earnings absent an injury.

If injured and comparison workers differ systematically across other factors related to earnings, this could generate post-injury differences we would wrongly attribute to earnings losses. To address this, we control for potential confounders represented by the term in Equation (1). The workers' compensation and IRS earnings data provide a rich set of covariates, including gender, age, firm size, job tenure, and pre-injury employment and wage patterns. The covariates we included in the regression model are:

- the variability of pre-injury earnings as measured by the coefficient of variation (standard deviation divided by the mean) over the entire pre-injury period, by quartile,
- the number of years employed in the prior eight years before injury,
- the size of the at-injury employer, based on the total number of workers in the U.S.,
- industry, two-digit Standard Industrial Classifications (SIC),
- whether the worker was in the public or private sector at the time of injury,
- tenure at the firm at the time of injury, and
- age at the time of injury, in 5-year intervals.

To allow for differences in pre- and post-injury trends in earnings, we interacted these variables with pre-injury and post-injury time trend variables. We also included fixed effects for year of injury. We estimated the regression model separately by gender. Note that if we accurately captured other factors associated with earnings, we would expect no difference in earnings between the injured and comparison workers during the pre-injury period and thus the estimated

earnings loss, represented by the terms above, should be approximately zero.

We also allowed for different types of injuries to have different effects on earnings or participation in self-employment. Specifically, we interacted each injury type (moderate temporary, severe temporary and permanent) with year from injury dummy variables. Also, we estimated a first difference model to eliminate the effect of fixed, unobserved heterogeneity across workers and to reduce the impact of serial correlation in earnings [Boden and Galizzi, 2003] as well as a fixed effect model. Our findings were robust to both empirical specifications, suggesting the findings were not influenced by model selection.

We hypothesized that some of the recovery is due to self-employment earnings that have not been recorded in the past. To test this hypothesis, we examined self-employment participation rates across the different injury types. To estimate self-employment participation we used a logistic regression model of whether or not the worker had any self-employment income to account for the large number of zeros in the response variable. We then predicted the probability of participation based upon the estimated logistic coefficients.

It is common to estimate the earnings losses as a percent of potential (non-injured) earnings. To convert our earnings losses estimates to percentages, we divided the estimated losses by the predicted comparison earnings of injured workers (based on the regression model with all covariates held equal to their mean values for injured workers). For average predicted probability of self-employment wages, we report the average predicted probability for each group of workers.

Measuring Earnings Losses and Replacement Rates

To estimate the cumulative earnings losses over the 10 years post-injury, we calculated the present discounted value (PDV) of the sum of the estimated differences from the individual years. To calculate the PDV, we used a discount rate of 0.029 and include the year of injury in the PDV (the rate used by the SSA Office of the Actuary in the 2009 Trustees Report).

We compared the PDV of benefits received for the injury to the PDV of earnings losses to assess fraction of the lost earning from the injury that were replaced by benefits. We only observed the total benefits received by the injured workers as of a given calendar year, and not the dates in which they were paid. However, we received information at two different points in time: benefits paid as of September 2002 and benefits paid as of June 2010. For each case, we could determine the proportion of benefits paid by September 2002 and by June 2010, respectively. Because injuries in our data occurred between January 1992 and December 2001, we could determine the average proportion of benefits paid

within each 1-year interval up to 10 years. (We assumed that no benefits were paid later.) Using the estimated number of years to payment date, we computed the PDV of indemnity benefits using the 0.029 discount rate we use elsewhere.

Because workers' compensation benefits are not taxed, we estimated both the before-tax and after-tax replacement rate. The after-tax calculation uses average marginal tax rates for wages at the state and federal level using the TAXSIM model [Feenberg and Coutts, 1993], compiled by the National Bureau of Economic Research for the state of New Mexico (http://users.nber.org/~taxsim/, accessed April 26, 2013). Our sample of workers has lower wages than the average in the state. As a result, our estimates reflect higher marginal tax rates than actually experienced by injured workers and these rates leads to lower after-tax income. Thus, our replacement rate estimates will likely over-represent after-tax workers' compensation benefits and thus will produce more conservative estimates of earnings losses.

RESULTS

Table I presents the distribution of worker, employer, and injury characteristics for the comparison group and workers with lost-time injuries by gender. The injured workers tended to be older, work for the larger, private firms for fewer years, experience more variation in their wages prior to injury, and have lower wages in the year prior to injury. Note that from this point on, we use "injuries" synonymously with "lost-time injuries."

Figure 1 displays the regression-adjusted ratio of average annual earnings of lost-time workers to the comparison group by gender. The vertical axis displays the ratio of average annual earnings of lost-time injured workers and comparison workers. The horizontal axis displays the calendar years before and after injury (with year of injury denoted year 0). Workers' compensation benefits are not included in the earnings estimates. The gray bars represent the 95% confidence interval of proportional earnings losses estimate for each year.

In the pre-injury period, the regression-adjusted earnings of the injured workers and the comparison group differ for women and men respectively by about $140 ($P = 0.11$) and $112 ($P = 0.24$)—or less than one percent—two years before injury. In the year of injury, there is a sharp decline in average earnings for the injured workers compared to comparison workers. The year after the injury, there is a widening of the

TABLE I. Summary Statistics for New Mexico 1994–2000 Injuries: Medical-Only and Lost Time Injured Groups

	Females		Males	
	Lost time	**Medical-only**	**Lost time**	**Medical-only**
Age at injury	40	37	37	34
Tenure	2.17	2.25	1.94	1.93
Industry of at-injury employer (%)				
Agriculture, forestry, and fishing	1%	1%	2%	2%
Mining	0	0	8	5
Construction	2	3	23	19
Manufacturing	6	7	9	11
Transportation, Communication, Electric	6	8	10	7
Wholesale trade	2	2	6	6
Retail trade	28	21	15	18
Finance, insurance, and real estate	3	3	1	1
Services	45	47	19	23
Public administration	5	7	6	9
National firm size (average)	62,656	44,721	25,673	24,796
median	1,229	1,690	263	449
At-injury firm less than 50 workers (%)	11%	6%	23%	16%
At-injury firm is public employer (%)	13%	18%	9%	13%
Number of years employed in the last 8 years	6.40	6.40	6.55	6.40
Coefficient of variation of pre-injury earnings	0.89	0.77	0.81	0.73
Wage in year prior to injury (thousands)	17.35	20.13	24.34	25.86
Self-employed in year prior to injury	4%	3%	3%	2%
N	12,228	25,899	23,446	38,601

[a]All differences are statistically significant except tenure, firm size and the proportion of wholesale trade workers for males and the proportion of agriculture, mining, manufacturing, and wholesale trade workers for women.
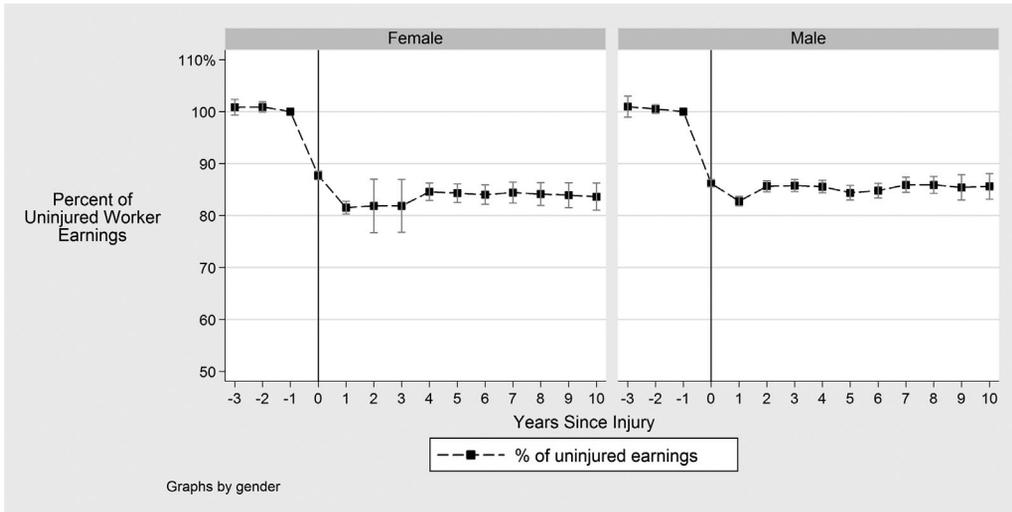
**FIGURE 1.** Average annual wages of injured workers relative to comparison group.

gap between the injured and comparison workers. In the year of injury, the difference between earnings of the two groups is approximately 12% and 14% for women and men, respectively, which increases to 18% and 17% one year after injury. At no point do the proportional losses of women and men differ significantly. The difference between the injured workers and their comparison group increases to about 15% over the next 3 years and then slowly increases over the next 6 years for men while remaining relatively flat for women. The earnings losses estimates are statistically significant at $P < 0.05$ in all post-injury years.

Figure 2 depicts the earnings losses estimates by injury severity for females and males. This figure is parallel to Figure 1. All lost-time injury types display the same general

pattern in earnings before and after injury that was observed in Figure 1. However, differences by injury type are most pronounced closer to the injury. One year after injury, workers with moderate temporary disability have losses of 10%, compared to losses of over 22% for workers with severe temporary disability. Earnings of workers with moderate temporary disability recover, but still incur earnings losses of about 12% even in the 10th year after injury. The severe temporary disability earnings losses follow a similar pattern but tend to improve more steadily over time, particularly for men. The workers with permanent injuries experience the largest losses. There is evidence of recovery from years 2–10 after injury, but losses of 18% for women and 15% for men persist in the 10th year after injury.
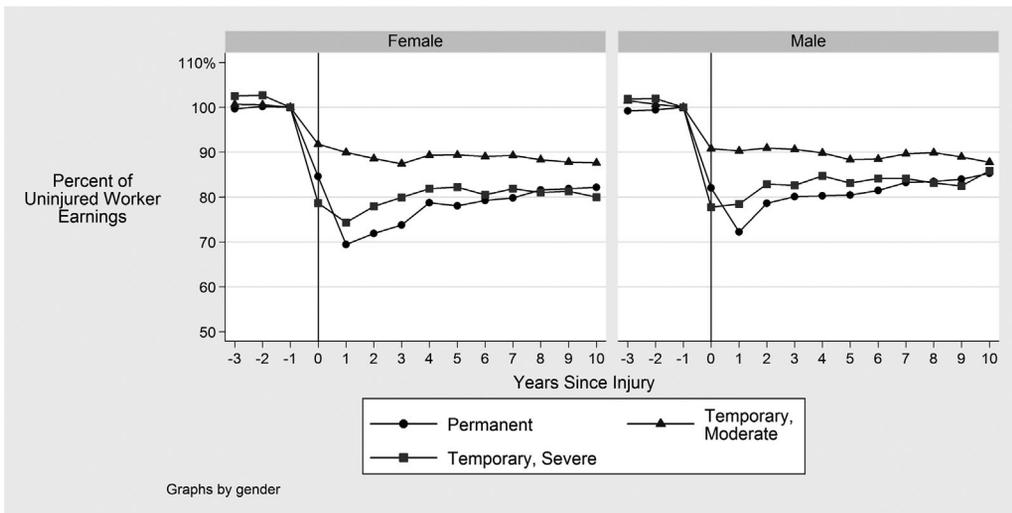
FIGURE 2. Annual wages relative to comparison group for men and women by injury severity group.
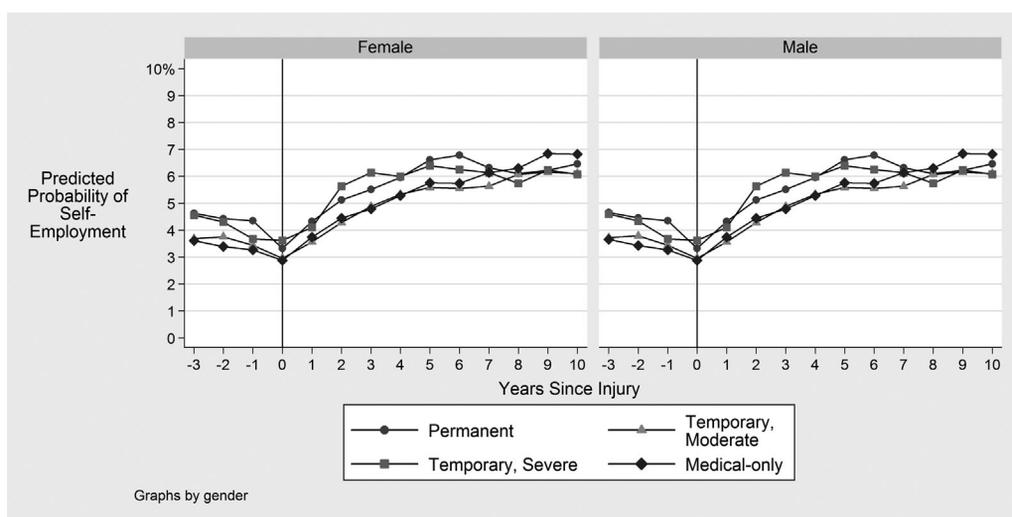
FIGURE 3. Predicted probability of self-employment for men and women by injury severity group.

The pattern of earnings losses is quite similar for males and females.

Figure 3 displays the predicted probability of self-employment by type of injury for women and men. The vertical axis reports the probability of self-employment. The horizontal axis again reports calendar years before and after injury. We opted not to report standard errors because the log-odds coefficients from the logit model are not significantly different from 0. The figure displays heterogeneity in self-employment likelihood by injury type, but there is not a clear trend before and after injury. This offers little evidence that self-employment is an alternative to the labor market for

severely injured and disabled workers that mitigates or offsets the lost earnings from their job.

Table II compares the aggregate discounted losses over the 10 years after injury to indemnity discounted cash benefits over the same period. The table reports the present discounted value of total earnings losses 10 years after an injury, the present discounted value of total paid indemnity benefits and the percent of earnings losses that is replaced by indemnity benefits. Replacement rates are reported as both pre-tax and post-tax.

The top panel of Table II compares the results by gender. Absolute losses are larger for men, but proportional losses are

TABLE II. Cumulative Earnings Losses and Replacement Rates Ten Years After the Year of Injury

	Years from injury	Earnings losses (2007$)	Potential uninjured earnings (2007$)	Proportional earnings loss (%)	Total indemnity (2007$)	Replacement rate	
						Before-tax (%)	After-tax (%)
By gender							
Males	10	38,725	262,732	15	5,553	13	17
Females	10	30,541	188,796	16	3,737	11	15
By gender and injury severity							
Males							
Moderate TTD	10	27,396	264,072	10	826	3	4
Severe TTD	10	45,042	258,503	17	6,638	15	20
PPD	10	58,122	303,666	19	14,395	25	35
Females							
Moderate TTD	10	21,287	193,605	11	646	3	4
Severe TTD	10	36,869	183,245	20	4,857	13	18
PPD	10	46,783	213,775	22	9,704	21	28

Note: The present discounted value is calculated using a 0.029 discount rate beginning the year of injury. After tax calculation uses average tax rates for wages at the state and federal level compiled by the National Bureau of Economic Research (http://www.nber.org/taxsim/~taxsim/ally/).

the same for men and women. Present values of earnings losses 10 years after injury are $38,725 for men and $30,541 for women. Replacement rates of lost income are similar for men and women. The after-tax replacement rate for the 10 years after injury is 17% for men and 15% for women.

Finally, the two bottom panels of Table II examine losses by gender and injury severity. As indicated by Figure 2, the proportional losses for male and female workers with less severe injuries are similar, though the levels are significantly higher for men because men tend to earn higher wages. Replacement rates are also similar for the less severely injured, but women with severe TD and PPD injuries appear to have higher proportional losses and lower replacement rates than men. The after-tax replacement rate for the 10 years after injury for male moderate temporary injuries is 4%. For the male severe TD injuries the after-tax replacement rate 10 years after injury is 20%, and for male PPD injuries it is 35%. Similarly, for women, the after-tax replacement rates for the 10 years after injury is 4% for moderate TD injuries, 18% for severe TD, and 28% for PPD injuries.

DISCUSSION

In this study, we used linked federal and state data to estimate the earnings losses experienced by injured workers in the New Mexico workers' compensation system. Our work improves on past estimates of benefit adequacy because our data include out-of-state and self-employment earnings and because we have data for 10 years after injury. We find substantial and persistent earnings losses in the post-injury period. For example, on average, PPD lost-time injured male workers cumulatively earn $58,122 less over 10-years than if they had not been injured. Even in their 10th year after injury, they earn $4,898 (15%) less than comparison workers.

Past research has shown persistent losses up to five years after injury and projected losses up to 10 years. These papers have hypothesized that this might be due to loss of employer-specific skills when injured workers lose their jobs, loss of general skills, and habits related to injury-related time off work, or stigma associated with those who have claimed workers compensation in the past. With actual earnings losses ten years into the future, we find strikingly similar results to other work in New Mexico [Reville et al., 2001]. For example, Reville et al. found steady improvement in PPD cases through 5 years after injury, similar to what we find here. Also, we find that proportional earnings losses of permanently disabled male workers to be 19% 10 years after an injury, while Reville et al. estimated proportional losses of 20.5%. While Reville et al. find higher after-tax replacement rates than we do here, that study could not discount the PPD benefits. Thus, our findings are consistent with past studies of New Mexico data using only state earnings.

We find that self-employment earnings do not play a significant role in the recovery of injured workers. Generally prior to injury, the injured workers are more likely to be self-employed than the comparison group. However, as indicated in Figure 3, this likelihood slowly declines over the post-injury period until 10 years after injury, at which time the comparison group is more likely to earn income through self-employment. In additional results not presented here, we observed, even though there are higher participation rates among injured workers when compared to the comparison group, the injured tended to earn less from self-employment than the comparison workers, though the differences were not statistically different. Furthermore, across gender and injury type, the percentage of workers with self-employment earnings is less than 8%, making this an unlikely mitigating factor.

Our findings are consistent with past work across many states that questions the adequacy of benefits provided to injured workers. Even considering their favorable tax treatment, workers' compensation indemnity benefits replaced less than 20% of lost earnings on average for both men and women. The 10-year, after-tax replacement rate of lost earnings was less than 40% in all cases. For the moderate temporary injuries, replacement rates were less than 5%. Replacement rates were equally low for men and women. Given these results, our study provides some validation that UI data can provide reasonable estimates of replacement rates, despite its limitations.

Past work has demonstrated that early and sustained return to the at-injury employer is among the best available options to mitigate future earnings losses [Reville et al., 2005]. Although New Mexico encourages worker retention by subjecting at-injury firms to potential fines if they do not offer re-employment, it remains unclear how often such fines are levied. Thus, one method to improve after-tax replacement rates might be to actively enforce these measures or follow the model of other states, like Washington and Oregon who subsidize the employers who rehire and accommodate injured workers. An obvious alternative is to increase workers' compensation benefits.

Our study has some limitations. Our sample came from a single small state, New Mexico, which is poorer than the national average and might have different labor market opportunities for injured workers, limiting the generalizability of our findings. Our data also involve relatively old data, and do not consider the implications of changing labor force conditions facing disabled workers in the wake of the Great Recession. We also had only limited information on the severity of injury.

However, almost all these limitations could be addressed with further research linking workers' compensation from different states to comprehensive, federal earnings data. Doing so would provide policymakers across the U.S. with important information about the adequacy of workers' compensation benefits for injured workers in their states.

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